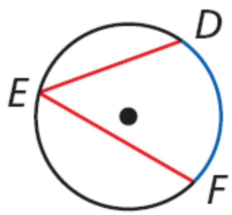
Pre-AP Geometry 12-4: Inscribed Angles

An **inscribed angle** is an angle whose vertex is on a circle and whose sides contain chords of the circle. An **intercepted arc** consists of endpoints that lie on the sides of an inscribed angle and all the points of the circle between them. A chord or arc **subtends** an angle if its endpoints lie on the sides of the angle.



$\angle DEF$ is an **inscribed angle**.

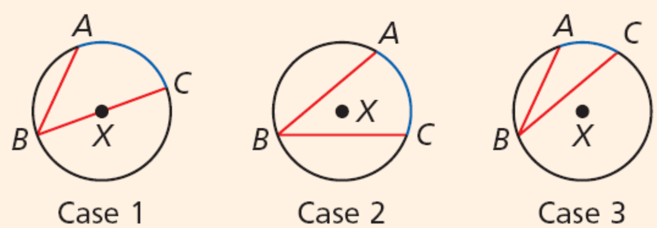
$\overset{\frown}{DF}$ is the **intercepted arc**.

$\overset{\frown}{DF}$ subtends $\angle DEF$.

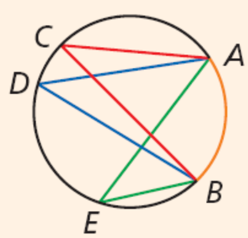
Theorem 11-4-1 **Inscribed Angle Theorem**

The measure of an inscribed angle is half the measure of its intercepted arc.

$$m\angle ABC = \frac{1}{2}m\overset{\frown}{AC}$$

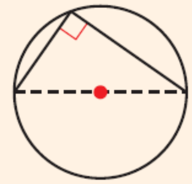


Corollary 11-4-2

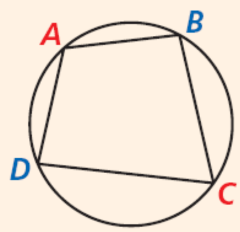
COROLLARY	HYPOTHESIS	CONCLUSION
If inscribed angles of a circle intercept the same arc or are subtended by the same chord or arc, then the angles are congruent.	 $\angle ACB$, $\angle ADB$, and $\angle AEB$ intercept $\overset{\frown}{AB}$.	$\angle ACB \cong \angle ADB \cong \angle AEB$ (and $\angle CAE \cong \angle CBE$)

Theorem 11-4-3

An inscribed angle subtends a semicircle if and only if the angle is a right angle.

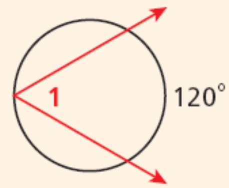
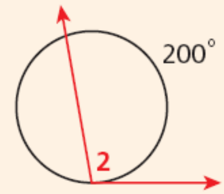
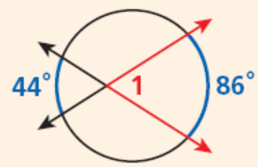
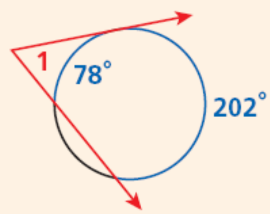
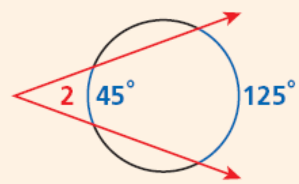


Theorem 11-4-4

THEOREM	HYPOTHESIS	CONCLUSION
If a quadrilateral is inscribed in a circle, then its opposite angles are supplementary.	 *ABCD* is inscribed in $\odot E$.	$\angle A$ and $\angle C$ are supplementary. $\angle B$ and $\angle D$ are supplementary.

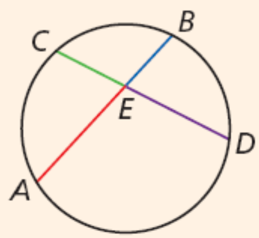
Pre-AP Geometry: 12-5: Angle Relationships in Circles

Angle Relationships in Circles

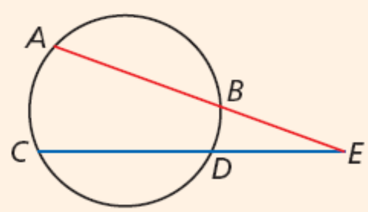
VERTEX OF THE ANGLE	MEASURE OF ANGLE	DIAGRAMS	
On a circle	Half the measure of its intercepted arc	 $m\angle 1 = 60°$	 $m\angle 2 = 100°$
Inside a circle	Half the sum of the measures of its intercepted arcs		$m\angle 1 = \frac{1}{2}(44° + 86°)$ $= 65°$
Outside a circle	Half the difference of the measures of its intercepted arcs	 $m\angle 1 = \frac{1}{2}(202° - 78°)$ $= 62°$	 $m\angle 2 = \frac{1}{2}(125° - 45°)$ $= 40°$

Pre-AP Geometry 12-6: Segment Relationships in Circles

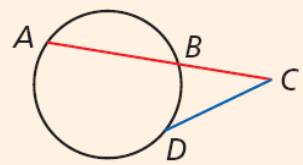
Theorem 11-6-1 **Chord-Chord Product Theorem**

THEOREM	HYPOTHESIS	CONCLUSION
If two chords intersect in the interior of a circle, then the products of the lengths of the segments of the chords are equal.	 Chords $\overline{AB}$ and $\overline{CD}$ intersect at E.	$AE \bullet EB = CE \bullet ED$

Theorem 11-6-2 **Secant-Secant Product Theorem**

THEOREM	HYPOTHESIS	CONCLUSION
If two secants intersect in the exterior of a circle, then the product of the lengths of one secant segment and its external segment equals the product of the lengths of the other secant segment and its external segment. (whole • outside = whole • outside)	 Secants $\overline{AE}$ and $\overline{CE}$ intersect at E.	$AE \bullet BE = CE \bullet DE$

Theorem 11-6-3 Secant-Tangent Product Theorem

THEOREM	HYPOTHESIS	CONCLUSION
If a secant and a tangent intersect in the exterior of a circle, then the product of the lengths of the secant segment and its external segment equals the length of the tangent segment squared. (whole • outside = tangent^2)	 Secant $\overline{AC}$ and tangent $\overline{DC}$ intersect at C.	$AC \cdot BC = DC^2$

Pre-AP Geometry 12-7: Circles in the Coordinate Plane

Theorem 11-7-1 Equation of a Circle

The equation of a circle with center (h, k) and radius r is $(x - h)^2 + (y - k)^2 = r^2$.